The South Carolina
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Silvicultural Strategies – A Matter of Choice

Foresters are sometimes criticized for not listening to landowners and thus fail to provide resource management strategies that are fully in line with landowner objectives. Part of the problem may be that both landowners and foresters think and operate within a relatively narrow range of opportunities. Landowners may not be aware of the variety of forest management options that are available to them, and foresters rightfully have a natural tendency to stick with tried and true methods of resource management. The feature article in this issue of the *Forest Steward* discusses "Alternative Silvicultural Systems" for growing trees. Some of these systems are not widely used and are somewhat controversial among foresters with respect to economic benefit and overall effectiveness. Lack of experience at implementing these systems contributes to the controversy. Nonetheless, these topics will hopefully broaden our range of thinking and choices that are available for effective forest resource management.

Larry Nelson, Editor

Alternative Silvicultural Systems for Managing Your Forest

Compiled by Larry Nelson, Bob Franklin, and George Kessler
Clemson Extension Foresters

The most widely used silvicultural system for harvesting and regenerating pines in the southeastern United States is clearcutting followed by artificial regeneration — by hand or machine planting nursery-grown seedlings. This system is widely accepted by foresters because it is highly efficient and consistently successful. A few important advantages of clearcutting and artificial regeneration include minimized logging costs, stocking control (number and spacing of seedlings), and utilization of genetically improved pine seedlings. Ecologically, the large clearings somewhat mimic natural disturbances from sources such as fire, insect mortality and storms, and provide ideal growing conditions for southern pine seedlings which require open sunlight for survival and growth. Clearcutting is regarded by foresters as the best system for maximizing merchantable wood production per acre, but it does not always satisfy the objectives of private landowners.

Recent surveys show that private landowners as a group rank timber income behind such amenities as wildlife, aesthetics, personal recreation and satisfaction of ownership as a reason for owning forestland. Timber income may be desirable, but not at the expense of the other objectives. In this case, alternative silvicultural systems may provide for a wider range of landowner objectives.

The systems described below are well documented in forestry literature but are not fully utilized by foresters in the Southeast. Although alternative silvicultural systems can provide a profitable timber crop, generally less merchantable wood is produced per acre than with clearcutting, and more time and planning are required. One of the major obstacles to using these systems is locating a forester that has the experience and willingness to implement them.

Uneven-Age Management

Uneven-age management involves managing three or more age classes of crop tree species on the same tract of land. Some important features of uneven-age management are as follows:

- A significant stand of timber is always present on the site. Instead of clearcutting, timber is harvested periodically by individual tree or group selection.
- Timber quality is improved during scheduled harvests. Selection harvesting removes trees of poor growth and form which in turn results in accelerated growth of the best trees.

- This process requires little capital, and provides periodic income while the stand is being improved.
- Volume production is concentrated on valuable sawtimber trees.
- Regeneration costs associated with even-age management are less with uneven-age systems. Each harvest represents a reproduction cutting. Removal of large trees during harvest creates openings in the stand that allow pine seedlings to regenerate from seed from adjacent trees.
- Stands are not as vulnerable to complete destruction by wildfire, ice storms, hurricanes, disease and insects as are even-age stands.
- Long-term uneven-age management results in conditions somewhat similar to old-growth forests. Stand structure and biomass become fairly stable, but other attributes of old-growth such as downed woody debris and low net-growth are less likely to occur.

Essentially, uneven-age management means harvesting timber with light thinnings and creating gaps for regeneration on a periodic cutting cycle. The trees selected for harvest are marked and selections are made on an individual or small-group basis. Decisions on which trees to cut and which to leave require the land manager to look at each tree in the stand, its relative position, health, dominance, and rate of growth and determine how its presence or absence will affect landowner objectives.

Management in this manner can produce a patchy forest with groves of older trees, interspersed with groups of younger saplings, middle-age clumps and areas of reproduction. This produces a great deal of diversity on a small scale benefiting many species of wildlife. The forest is generally more natural in appearance compared with even-age systems.

Some disadvantages of uneven-age management include:

- Certain area-efficient management practices, such as prescribed burning and chemical treatments, may be difficult to apply.
- Harvesting may be more difficult.
- The forester must utilize more complex management strategies than with other methods.

Economics

Total merchantable wood production using uneven-age management is generally less than with even-age systems. However, in the long-term, production of high value products such as veneer and sawlogs may be greater. A limited number of economic comparisons of even-age versus uneven-age management show that uneven-age stands rank higher in net present value than even-age stands if initial growing stock and land are not considered a cost. Using these systems, private landowners can maximize their rate of return because of low establishment costs. However, other variables such as interest rate, the cost differential between sawtimber and small roundwood, site productivity and initial stocking levels also effect economic comparisons. More studies are needed to provide foresters and landowners with accurate economic information over the wide range of conditions encountered with uneven-age management.

The bottom line is that uneven-age stands may not be as profitable as even-age stands, but will allow a reasonable income from timber while meeting many other objectives that the landowner may consider just as valuable.

Natural Regeneration

Other alternatives to either clearcutting or artificial regeneration include various even-age natural regeneration systems. Regeneration with these systems is dependent upon seed production from residual pines left after harvest or from pines adjacent to the harvested area. Five methods are described below.

The seed tree method removes most of the trees in one cut, leaving a few, well-spaced good seed producers over the area. The number of seed trees left depends upon size, species, cone-bearing characteristics and site conditions (see Table 1). The seed tree system is the most widely used natural regeneration system and is particularly suitable for the coastal plain of South Carolina. The seed tree system works well with loblolly and shortleaf pines

Table 1. Recommended number of seed trees for loblolly, shortleaf and longleaf pine.

DBH[1]	Loblolly	Shortleaf	Longleaf
10	12	20	55
12	9	14	38
14	6	12	28
16	4	12	21

[1]Diameter of tree in inches at breast height (4½ feet above ground)

because of the frequency of good seed crops. Longleaf pine is more difficult to establish with the seed tree system because good seed crops are infrequent. The shelterwood system is recommended for longleaf.

The shelterwood system involves leaving many more trees than the seed tree system above. Generally 25 to 40 square feet of basal are per acre is left after the cut. This is equivalent to 23 to 37 14-inch trees per acre. The shelterwood system can be highly suitable on piedmont and coastal plain sites. An advantage of the shelterwood system is that enough volume is left to get market price for removal after regeneration is established and quality growth can occur while regeneration is being established.

Clearcutting in strips enables you to make periodic harvest cuts while managing even-age units. The clearcut strips may be of any length, but preferably about 200 feet wide. Strips should be perpendicular to the direction of prevailing winds to ensure good seed dispersal.

Seed-in-place involves clearcutting the stand after the peak of seed fall, but before the start of germination. This method is best applied during a four to five-month winter logging period. The system can be used only when an ample crop of seed is available. Seed-in-place is not recommended for longleaf pine.

Seedlings-in-place involves clearcutting a stand during the summer following a good seed year. Newly-germinated seedlings spend a portion of the first growing season in the shade of the current stand. This system allows more certainty of having a satisfactory number of seedlings following germination than the seed-in-place system.

Advantages of natural regeneration are:
- Lower establishment cost
- Less labor and heavy equipment are required
- Less soil movement
- No problem with the geographical origin of the seed
- Reduced tip moth damage to new regeneration
- New seedlings have a better root system than with planted seedlings
- Less immediate visual impact

Disadvantages include:
- Less control over spacing and initial stocking
- Rotations are potentially longer
- Risk of seed tree loss
- Yields are generally slightly lower than with artificial regeneration
- No use of genetically improved seedling stock
- Precommercial thinning is often necessary because of overstocked regeneration.

Natural regeneration can be highly favorable in situations where the landowner desires a low investment in regeneration, is not necessarily managing for maximum wood production and values a more natural looking forest with minimal physical impacts resulting from silvicultural practices.

Stand Rehabilitation

Pine stands that have relatively low stocking as a result of storm damage, various harvesting practices or for other reasons can often be rehabilitated at low cost. USDA Forest Service studies have shown that stands with 25 percent stocking or slightly lower can achieve an acceptable stocking level of 60 percent within 15 years or less if the stand has at least 5 square feet of initial basal area.

Stands that are candidates for rehabilitation may have as little as 50 to 80 trees per acre in various size classes. If the trees are of good form and vigor and are uniformly distributed, stocking levels will increase rapidly if competing hardwoods are effectively controlled. In one study a stand with 30 percent initial stocking (2 cords of pulpwood and 257 board feet of timber) produced 6.2 cords of pulpwood and 2,772

board feet of timber after only 10 years. Rehabilitation costs ranged from 45 to $50 per acre for controlling hardwoods.

Landowners should be aware that effective stand rehabilitation is a management option that can provide a reasonable rate of return if conducted properly. However, each stand must be evaluated on its own merit and should be done so with the assistance of an experienced forester.

Mixed Pine-Hardwood Management

Most professional foresters reject the idea of managing pine and hardwood on the same site or in the same stand for economic and logistical reasons. Pine species generally bring better merchantable value on the majority of sites across the southeast, and thus are preferred over hardwoods. Hardwood components of mixed stands exist at the expense of the more valuable pine. Furthermore, most foresters have little or no training on how to manage for more than one species at a time. Nevertheless, for aesthetics, wildlife or other objectives, some landowners may prefer to retain hardwoods on a portion of their land.

Recent Forest Service studies provide guidelines for establishing stands of mixed pine and hardwood. The argument for this type of management is that a large percentage of our upland forests are comprised of mixed stands or low grade hardwoods, and many private landowners simply do not have the resources ($150 to $250 per acre) required to convert to pure pine stands. Why not manage for both? Guidelines specify felling and burning techniques for establishing pine among mixed hardwood sprouts. In a recent study, winter or spring felling of hardwoods followed by summer site preparation burns allowed for survival of 200 to 400 pines per acre after six growing seasons. At this time pine growth was competitive with the hardwoods.

Options are also available for retaining hardwoods in otherwise uneven-age pine stands. Where hardwoods are uniformly distributed throughout the stand, their presence will result in less pine production. As a rule of thumb, pine basal area will be reduced by two square feet for each one square foot of hardwood.

An alternative to retaining hardwoods on each acre is to leave hardwoods in certain parts of the stand while maintaining pure pine in the rest of the stand. This option can allow hardwood retention on certain terrain features such as drainages or north-facing slopes with the highest hardwood site quality. Concentrating hardwoods in certain areas can provide cover and corridors for wildlife and can be convenient for cutting firewood.

Summary

Studies have shown that much nonindustrial private forestland in the southeast is only producing at one-half or less of its wood-growing potential. Reasons given for this lack of management by many landowners have been, high investment costs, long payback periods and a concern that traditional forestry as practiced in the South could degrade aesthetics and wildlife habitat. The above-mentioned silvicultural alternatives have the potential to increase wood production off many nonindustrial private lands while providing for and enhancing many of the nontimber concerns. These alternatives are low-cost and can improve wood growing possibilities on hundreds of thousands of acres that might not be managed otherwise. Consider them and explore how they may fit into your woodland management plans.

What Does it Cost to Do Nothing?

A long-term demonstration at the Crossett Experimental Forest in Crossett, Arkansas shows loss in “opportunity costs” involved with not managing forests for timber production.

In 1935, two 40-acre sites were set aside as “natural areas.” No management practices, excluding fire protection had been undertaken since a 12-inch diameter limit cut in 1915. Starting in 1937, one of the 40-acre blocks was managed for pine production. It has had some harvesting every six years along with control of overstory and midstory hardwoods. Every few years, trees were measured and production was compared on the two blocks of land.

The unmanaged area is now a mixed pine-hardwood forest. It may be aesthetically pleasing to some landowners, but in terms of sawtimber growth is not very productive. During the 46 year inventory period (1937-1983), the unmanaged area grew 120 board feet per acre per year of pine timber, and the hardwoods grew 26 board feet. The managed 40-acre block grew 435 board feet per acre per year of pine sawlogs — a 260 percent increase over the unmanaged stand!

At current Arkansas timber prices, a landowner would have received $53 per acre for doing nothing. By comparison, management would have provided the landowner with $178 per acre — an additional $5,000 per year. Even more enlightening is the current and potential production on the two blocks. As of 1983, the unmanaged stand had grown 5,906 board feet of pine compared to 19,129 board feet on the managed stand. The managed stand is now producing 600 board feet per acre per year. Based on an average Arkansas stumpage value of $410 per thousand board feet — Doyle scale, the managed stand is now producing about $246 worth of sawlogs per acre annually compared to $16 on the unmanaged stand!

Landowners may believe that there are no costs involved in letting their woodlots grow into something similar to a natural area, since they're doing nothing and thereby incurring no expenses. However, they are losing a considerable amount of potential income.

Timber Sales & Capital Gains Treatment

George Kessler, Professor of Forest Resources, Clemson University

Federal income tax laws relating to forest landowners can be quite complex. While this is true, there are a number of strategies that allow landowners to avoid overpayment of taxes on forestry income. The following information on capital gains treatment was extracted from "Forestry and the Federal Income Tax" by Dr. George Kessler, Professor of Forestry at Clemson University.

There are three reasons a taxpayer may want to sell timber so that the timber income qualifies for capital gains treatment. One reason is capital losses. Under normal circumstances capital losses may be used to offset only $3,000 of ordinary income per year. There is no limit on using such losses to offset capital gains. You may deduct capital losses from any source from capital gains income.

A second reason is the self employment tax. Sole proprietors or partners operating as a business are subject to self-employment tax on ordinary income from the business. If your timber sale qualifies and is reported as a capital gain then you are not subject to self employment tax. For 1997 the self-employment tax rate is 15.3 percent for the first $65,400 and 2.9 percent for all income above $65,400. Capital gains income is not subject to self-employment tax.

A third reason is that as changes are made to the tax code, a differential can be created. In fact, the 1997 tax changes have set new rates for all taxpayers. Taxpayers whose income levels fall in the upper tax brackets have a capital gains rate of 20 percent, while the tax rate for the lowest income level will be 10 percent for all capital gains after May 6, 1997. Capital gains income on or before May 6, 1997 has a capital gains rate of 28 percent.

Qualifying for Capital Gains

One way to selling timber is for a lump sum. This is the outright sale of standing timber for a fixed dollar amount agreed upon in advance. The dollar amount is not a function of the volume of timber actually cut. This does not mean there is no relationship between volume and price. A taxpayer, operating as an informed seller, should have some idea of the volume of timber being sold. Under lump sum the buyer and the seller agree upon a price. There is no adjustment if the sale provides more or less timber than either party may have thought was present. Timber held for personal use or for investment will generally qualify for capital gains under Code Section 1221.

Timber held for a trade or business can qualify for capital gains under Code Section 1231 as long as the taxpayer can qualify as a trade or business. There are two ways to qualify under Code Section 1231. They are disposal with a retained economic interest (631 (b)) and by cutting the timber yourself and converting it into logs or other products (631 (a)).

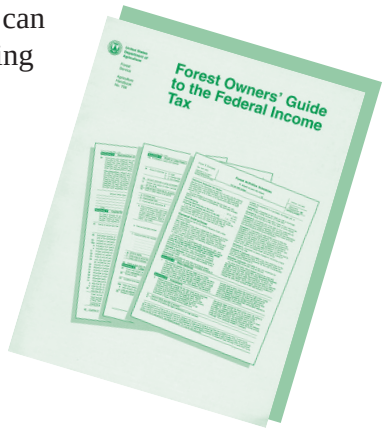
Disposal with a retained economic interest is the same as a "pay as cut" contract in which the taxpayer receives a set dollar amount for each unit of timber harvested: The owner retains an economic interest in the timber because he is paid only for the timber that is actually cut. This can be done in several ways. The taxpayer can receive payments as the timber is cut or as a lump sum prior to any cutting. Under this type of sale there is a direct relationship between volume and total dollars received. At some point there has to be a day of reckoning where an actual measurement of the amount cut is determined. This measurement determines the total dollar value of the sale.

When standing timber is cut by the owner and the logs or products manufactured from them are sold, the entire proceeds are reported as ordinary income unless a Section 631(a) election is in effect. Under 631(a) the

cutting is treated as a sale to yourself at fair market value as of the first day of the taxable year. By subtracting your allowable basis from this fair market value you determine the amount of gain that qualifies as a capital gain. In addition, the income received from the sale of the products is reduced by the fair market value plus the cost of the conversion (logging cost) and reported as ordinary income.

When you elect to use Section 631(a) you are committing yourself for the year you are filing and all future years to use this election. The 1986 Tax Reform Act does allow a taxpayer who was using 631(a) prior to 1987 to revoke the election one time and reelect one time. In addition, the election privilege exists any time the tax law changes the rate differential between capital and ordinary income. Taxpayers wishing to change at any other time can only do so by permission of the District Director for IRS.

Additional information can be obtained by purchasing Agriculture Handbook 708, "Forest Owners' Guide To The Federal Income Tax" from the U. S. Government Printing Office. The price of the book is ten dollars. ♣



Where to Go: Sources of Wildlife Assistance

Greg Yarrow, Associate Professor of Wildlife, Clemson University

There are sources of technical, educational and even financial assistance available for landowners, sportsmen and wildlife enthusiasts who are interested in improving their property for wildlife habitat. The key is knowing where to find this assistance. Various public agencies, organizations, associations, and individuals can provide you with assistance. Help from public agencies is usually general in nature; however, it is provided free of charge. Detailed plans and long-term assistance where a large amount of time is spent in providing assistance is available through private natural resource consultants who charge on a fee-basis, depending upon the type of services provided.

The lead agency in South Carolina that provides technical assistance for landowners and other interested groups for wildlife habitat enhancement is the South Carolina Department of Natural Resources (SCDNR). Trained SCDNR wildlife and fisheries biologists are located in districts across the state to provide technical expertise on a variety of wildlife and fisheries topics. Biologists in the field are supported by a diverse group of subject matter specialists in Columbia who have expertise in game, non-game, and fisheries management. Technical assistance from SCDNR biologists is provided at no charge. For more information on the types of technical assistance available and who to call in your area from SCDNR, contact the Columbia office at 734-3886.

Other agencies providing technical land management assistance which can positively influence wildlife habitats include the USDA Natural Resource Conservation Service (NRCS) and the South Carolina Forestry Commission (SCFC). The NRCS staff can help landowners develop a farm plan which provides guidance on how to properly manage a farming operation and at the same time implement improvements that benefit wildlife. NRCS technicians can also do the field work and designs for constructing fisheries and waterfowl impoundments. Foresters with the SCFC can develop forest management plans for landowners that also have considerations for wildlife incorporated into the forestry plan. This process can further benefit wildlife if SCFC foresters and SCDNR wildlife biologists work jointly on developing the plan, such as forest stewardship plans. Both the NRCS and SCFC have offices in most counties and districts across the state.

Private firms, companies, and individuals also provide technical wildlife assistance. The South Carolina Waterfowl Association (763-7421), is one example which can help landowners create or improve areas for waterfowl. Waterfowl assistance by this group is usually provided free or for a small fee basis. Several consulting firms and companies inside and outside of the state provide technical wildlife assistance on

a fee basis. For intensive, long-term assistance, a reputable natural resource consulting firm may be the best bet for serious minded landowners interested in improving wildlife habitat. Don't be afraid to ask consultants about their educational background and experience in the field. In addition, ask about references, especially from the consultants' past clients who have requested similar services that you desire. Consultants who provide wildlife services should also be Certified Wildlife Biologists, a designation given to biologists who have passed educational and experience qualifications of The Wildlife Society, a professional organization of wildlife biologists from across the U.S. For a list of consultants who provide wildlife services, contact me or your nearest SCDNR wildlife biologist. Some industrial timber companies, as a part of their landowner assistance programs, also provide limited guidance to landowners for considerations leading to wildlife habitat improvement practices as part of a forestry management plan. For more information on timber companies that offer landowner assistance programs contact your local SCFC office.

To learn more about wildlife and its management, educational information can be obtained from the Clemson Cooperative Extension Service in the form of publications, programs, workshops, and short courses. To find out about the type of information that

Cost-Share Program Signup Periods

Landowners should be aware of signup periods for the following cost-share programs. Contact your local NRCS or FSA office to sign up or for more information.

- **Forestry Incentives Program (FIP)**
  Month of March
- **Conservation Reserve Program (CRP)**
  Special environmental practices
  Continuous signup October to September 30
- **Wildlife Habitat Incentives Program (WHIP)**
  Continuous signup
- **Wetland Reserve Program**
  Continuous signup
- **Environmental Quality Incentives Program (EQUIP)**
  March 2-13
- **Forest Renewal Program (FRP)**
  Continuous signup at South Carolina Forestry Commission

Upcoming Events

Landowner Association Meetings	February 24	Chester County Forestry Association - "Sustainable Forestry Initiative"
	March 3	Fairfield Forestry Association - "Thinning Pine Stands/Young Pine Management"
	March 17	Anderson County Forestry Association - Nature Conservancy
	March 27-29	Palmetto Sportsman's Classic, Columbia, SC
	April 20	Kershaw County Forest Landowner Association - "Pine Straw Production"
Master Tree Farmer Programs	February 19-March 14	Pickens County, F149 P&A Building, Clemson University
	March 2, 9, 12, 16, 23 26, and 30	Chester County, Market Building, 116 Columbia Street, Chester, SC
	March 11-April 22	Allendale County, on consecutive Wednesdays, James Brandt Agricultural Building, Allendale, SC
Meetings	March 11-12	Forest Ecosystem Restoration. Aiken, SC. For more information, contact Steve Muzal, Clemson University, at 864/656-4842.
	April 7	Establishing and Managing Wildlife Food Plots, James Brandt Building, Allendale, SC
	June 3-5	Society of American Foresters Workshop on Bottomland Hardwood Management for Timber and Wildlife, Columbia Sheraton Hotel
	November 17-19	Second Biennial Longleaf Alliance Conference, Charleston Sheraton, Charleston, SC. Contact the Longleaf Alliance at 334/222-7779.

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is available contact your county Extension office. Information on wildlife can also be obtained through the SCWMRD district offices or from the main SCDNR office in Columbia.

Financial assistance for improving wildlife habitat is available on a cost-sharing basis for certain practices through the county Farm Services Agency (FSA) offices. Cost-sharing usually ranges from 40 to 85 percent, depending on the type of improvement practices requested. Cost-sharing through FSA is available as part of regular conservation practices or under special programs such as those found in the new Farm Bill. For more information on these programs contact your county FSA office. Cost-sharing on select forestry practices that benefit wildlife may also be obtained through the SCFC. For more information contact your county SCFC office.

Whatever your objectives are as they relate to wildlife, take advantage of the assistance that is available to you. The results will be worthwhile for you and the wildlife resources on your land.

Questions about this newsletter, submissions and requests for subscriptions should be directed to: Editor, *Forest Steward* Newsletter, Clemson University Cooperative Extension Service, Department of Forest Resources, 272 Lehotsky Hall, Box 341003, Clemson, SC 29634-1003. Phone: 864/656-2479.

The Forest Steward

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The South Carolina Forest Steward Newsletter is sponsored by the Forest Stewardship Program in South Carolina. For more information on the Forest Stewardship Program, contact Jeff Baumann at the South Carolina Forestry Commission, 803/896-8800. *The South Carolina Forest Steward* is compiled and edited by Larry Nelson, Extension Forester at Clemson University, 864/656-4866.

SOUTH CAROLINA FORESTRY COMMISSION